1062-82 Depressed Midwall Shortening Precedes Chamber Dysfunction in Pressure Overload

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To study the time course of decompensation in pressure overload with regard to LV myocardial and chamber functions, represented by fractional shortening at the midwall (FS_{mw}) and endocardium (FS_{endo}) respectively, we performed serial echo/Doppler at 1, 2, 4, 8 and 10 weeks after suprarenal aortic banding (B, n = 20) or sham surgery (S, n = 10). At 10 weeks, B achieved higher systolic blood pressure (BP) (155 ± 31 vs 93 ± 23 mmHg, $p < 0.05$) and circumferential systolic stress (σ_s: 155 ± 33 vs 87 ± 35 g/cm^2, $p < 0.05$).

FS_{endo} was reduced in B compared with S by 8th week (35 ± 6 vs 40 ± 7%, $p < 0.05$). However, the ratios of observed to predicted (O/P) FS_{endo} for given σ_s were similar (1.04 ± 0.02 for B vs 1.06 ± 0.1 for S, p = ns), suggesting that the observed reduction in FS_{endo} in B was due to afterload mismatch. In contrast, FS_{mw} was abnormal in B by 1 week. Furthermore, O/P FS_{mw} at 10 weeks was 0.91 ± 0.1 for B vs 1.0 ± 0.1 for S, p = 0.055, suggesting that some B rats did develop myocardial depression inapparent from FS_{endo} data. Similar to FS_{mw}, relative wall thickness became abnormal at 1 week (0.41 ± 0.1 for B vs 0.32 ± 0.02 for S, $p < 0.05$), and did not increase thereafter.

The rise in Doppler mitral deceleration slope in B appeared to parallel the decline in FS_{endo}, reaching statistical significance at 8 weeks (19 ± 6 for B vs 15 ± 5 for S, m/s/s, $p < 0.05$).

Thus in this model of pressure overload, LV chamber dysfunction is due to afterload excess, manifested late, and associated with restrictive Doppler filling abnormalities. However, reductions in FS_{mw}, suggestive of depressed myocardial function, parallel geometric remodeling and appear as early as 1 week after banding.

1063 Heart Failure in the Elderly

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Anaheim Convention Center, Hall E
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1063-173 Health-Related Quality of Life in Elderly Patients with Heart Failure Due to Primary Diastolic vs. Primary Systolic Left Ventricular Dysfunction

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Health-related quality of life (HRQL), a clinically relevant outcome measure, appears to be reduced in patients with heart failure (HF) due to systolic left ventricular dysfunction (SD). However, although the majority of HF patients are elderly, there are relatively few data regarding HRQL in older HF patients, particularly those with HF due to primary diastolic left ventricular dysfunction (DD) which is common in the elderly. Therefore, we examined 87 (44 DD, 43 SD) consecutive elderly (age 62–90) patients with symptomatic NYHA class II–III HF at baseline recruited for an NIH sponsored clinical trial. Mean and range of rest LV ejection fractions were: DD 69% (55–78%) and SD 29% (15–45%). HRQL was assessed with both generic and HF-specific measures. *Results:* On the Minnesota Living with Heart Failure questionnaire (MLHF), there was substantial HRQL impairment in both DD and SD HF groups in all three scales, including the physical (DD 13.6 ± 10; SD 19.3 ± 9.4), emotional (DD 4.9 ± 6.1; SD 8.5 ± 5.3) and total (DD 11.0 ± 19.6; SD 42 ± 21.0). However, even after adjustment for age and gender, HRQL was significantly worse in SD than in DD on the three MLHF scales ($p \leq 0.001$). In contrast, performance on two standard measures of physical exercise function, the six-minute walk test and peak exercise oxygen consumption, were reduced to a similar degree in SD and DD patients when compared to age and gender matched normals (16% and 30% lower, respectively; $p < 0.01$ for DD and SD vs normals). *Conclusion:* These data suggest that HRQL is impaired in elderly patients with HF due to DD but that the impairment is not as great as in elderly patients with HF due to SD, despite similar impairment in physical function.

1063-174 Ventilatory Threshold in Elderly Patients with Congestive Heart Failure Due to Primary Diastolic Dysfunction

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The ventilatory anaerobic threshold (VAT) in patients with congestive heart failure (CHF) has been shown to be a useful and feasible tool to assess aerobic capacity. It closely correlates with symptomatic status, as it reflects submaximal capacity used in activities of daily living. However, despite the high prevalence of primary diastolic dysfunction (DD) in elderly patients with CHF, no information is available regarding VAT in these patients. We therefore compared VAT in patients with DD (EF 69 ± 9%) and patients with primary systolic dysfunction (SD, EF 29 ± 10%) to age-matched healthy controls. Patients underwent an upright, maximum, symptom limited graded bike protocol exercise stress test with a breath-by-breath expired gas analysis. VAT was determined by a blinded observer using both the V-slope and the classic "Wassermann"-method. *Results:* VAT was readable in 30/30 normal controls (100%), 52/61 DD patients (85%) and 52/60 SD patients (87%):

	n	Age (years)	VAT VO_2 (ml/min)	VAT Time (sec)	VO_2 max (ml/min)
Normals	30	68 ± 5	827 ± 227	219 ± 142	1491 ± 376
DD	52	70 ± 7	712 ± 159*	114 ± 70*	1005 ± 257*
SD	52	70 ± 6	709 ± 151*	117 ± 70*	1061 ± 330*

Mean ± sd; * $p < 0.0001$ patients vs normals, T-test.

There were no significant differences between DD and SD patients. *Conclusion:* VAT is identifiable in 85% of elderly patients with CHF due to primary DD, is severely reduced compared to normals, and is similar to the reduction found in SD patients.

1063-175 Aerobic Capacity in Elderly Patients with Heart Failure Due to Primary Diastolic Dysfunction is Severely Reduced and is Similar to Systolic Dysfunction

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Exercise intolerance is a prominent symptom in chronic heart failure (HF) due to left ventricular systolic dysfunction (SD), can be quantified objectively, and has prognostic and therapeutic importance. However, although the majority of HF patients are elderly, there are relatively few data regarding aerobic capacity in older HF patients. Data are particularly sparse regarding aerobic capacity in HF due to primary diastolic left ventricular dysfunction (DD) which appears to be common among the elderly. Therefore we examined 114 consecutive elderly (mean age 70, range 60–90 years patients with stable NYHA class II–III heart failure at baseline in an NIH sponsored trial and 31 age-matched healthy normals (NL). All subjects underwent screening exercise echocardiograms to exclude significant ischemia and valvular disease and for measurements of resting LV ejection fraction (LVEF). Subjects underwent maximal upright bicycle exercise with on-line breath-by-breath expired gas analysis for measurement of peak oxygen consumption (VO_2 ml/min), VO_2/kg (ml/kg/min), respiratory exchange ratio (RER), and workload (Watts).

	n	LVEF	peak VO_2	peak Vo_k/kg	peak RER	peak watts
DD	59	69 ± 9*#	1005 ± 257*	12.9 ± 2.8*	1.09 ± 0.12	48 ± 19*
SD	55	29 ± 10*	1061 ± 330*	13.4 ± 3.1*	1.08 ± 0.10	48 ± 22*
NL	31	58 ± 4	1491 ± 376	19.3 ± 3.9	1.13 ± 0.09	73 ± 31

Mean ± Std. Dev.; *$p < 0.0001$ vs NL; #$p < 0.0001$ vs SD

Conclusion: Aerobic capacity in elderly patients with heart failure due to primary diastolic dysfunction is severely reduced compared to age-matched normals and is similar to patients with heart failure due to systolic dysfunction.

1063-176 Effect of Propranolol on Mortality in Patients With Prior Myocardial Infarction, Congestive Heart Failure, and Left Ventricular Ejection Fraction ≥ 40%

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In a prospective study, we randomized 158 patients (pts), mean age 81 years, with New York Heart Association functional class II or III heart failure, myocardial infarction > 6 months old, and left ventricular ejection fraction (LVEF) ≥ 40% treated with diuretics plus angiotensin-converting-enzyme inhibitors for 2 months to propranolol (P) or to no P. Initial dose of P was 10 mg daily. P was increased over 3 months to 30 mg 3 times daily. P was stopped because of adverse effects in 11 of 79 pts (14%). Follow-up was 32 ± 15 months for P pts and 31 ± 17 months for no P pts. Death occurred in 44 of 79 P pts (56%) and in 60 of 79 no P pts (76%) (p = 0.007). Death plus nonfatal myocardial infarction occurred in 47 of 79 P pts (59%) and in 65 of 79 no P pts (82%) (p = 0.002). At 1 year, P caused